



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

11

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/639,636      | 08/15/2000  | Renato Guida         | RD-25,905/USA       | 3536             |

6147 7590 10/10/2003

GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH CENTER  
PATENT DOCKET RM. 4A59  
PO BOX 8, BLDG. K-1 ROSS  
NISKAYUNA, NY 12309

|             |
|-------------|
| EXAMINER -- |
|-------------|

LUK, EMMANUEL S

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

1722

DATE MAILED: 10/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/639,636

Applicant(s)

GUIDA ET AL.

Examiner

Emmanuel S. Luk

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 10-12 and 15-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-12 and 15-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 10, 11 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambda Physik Industrial Report.

Lambda Physik teaches a system (Fig. 6) creating microholes by laser ablation, the system having a high power laser for providing laser light, a beam homogenizer for conditioning the laser light, a phase mask for creating a pattern of the conditioned laser light and a substrate that is ablated by the laser with a pattern. The lens for focusing the pattern of conditioned light is an objective lens (Fig. 1, page 7), a 5x lens (MicroLas objective 5x/18-248) is used for demagnification (page 8).

Lambda fails to teach ablating openings with slopes less than or equal to 0.25 degrees on a substrate having a thickness ranging from 0.3 to 1.5 millimeters.

The substrate for an anti-scatter x-ray grid is a product of the system and is an intended use of an apparatus claim. Additionally, the ablated openings having slopes less than or equal to 0.25 degrees includes having 0 degrees or no slope and extending completely through a polyimide ceramic structure (see also Fig. 10). This means that there can be straight vertical openings by the ablation and having no wall angle range. Lambda teaches the progress of increasing the wall angle ranges from ablation. That a "shallow angle" is produced by the beam (Page 5, last paragraph of Column 1). What is being claimed includes no angle to the wall of the openings.

In regards to the thickness, the Lambda reference, merely teaches ablation in thin film. Thin film can be regarded in the millimeters including 0.3 to 1.5 millimeters, one skilled in the art recognizes that thickness from a few millimeters or less would be considered as 'thin'.

In regards to claims 15-17, the conditioned light of the laser from the homogenizer and mask (Fig. 1) is capable of the focused patterns and is an intended use of the apparatus for forming the desired product.

It would have been obvious to one of ordinary skill in the art to modify Lambda with ablation of the openings with no slope angles, just a straight vertical opening, and the laser, homogenizer and mask can be adjusted to form the desired pattern in the film.

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambda Physik Industrial Report in view of Konishi.

Lambda Physik teaches the claimed apparatus as shown in the above paragraph. Lambda Physik fails to teach an objective lens that is an axial gradient-index lens.

Konishi teaches an objective lens system having a first lens unit composed of a cemented lens component comprising at least one gradient index lens, the gradient index lens having a concave surface on the object side and a refractive index varying dependently on distances as measured from the optical axis in the radial direction (Col. 2, lines 19-25).

It would have been obvious to one of ordinary skill in the art to modify Lambda Physik with an axial gradient index lens as taught by Konishi because it allows for lens element that have refractive indices varying dependently on distances as measured from an optical axis in a radial direction (Col. 1, lines 6-9).

5. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambda Physik Industrial Report in view of Guida et al.

Lambda Physik teaches a system (Fig. 6) creating microholes by laser ablation, the system having a high power laser for providing laser light, a beam homogenizer for conditioning the laser light, a phase mask for creating a pattern of the conditioned laser light and a substrate that is ablated by the laser with a pattern. The lens for focusing the pattern of conditioned light is an objective lens (Fig. 1, page 7), a 5x lens (MicroLas objective 5x/18-248) is used for demagnification (page 8). Lambda Physik teaches the optimization in efficiency in tooling technologies for ablation tools through the use of

lasers (p. 6). Lambda additionally teaches the removal of debris after laser ablation from the surface (Table 1).

Lambda fails to teach means for filling the ablated portion and means for removing additional portions of the substrate.

Guida teaches the cutting of channels in substrates, via laser fabrication and cutting saws (Col. 5, lines 6-13), the channels are filled under vacuum conditions with absorbing material that can be readily melt-flowed into the channels (Col. 5, lines 35-38), the substrate is polished to remove any excess or stray metal (col. 6, lines 40-42).

Lambda teaches plasma-assisted etching techniques for removing debris after laser ablation forms the patterns, therefore, Lambda teaches means for removing additional portions of the substrate.

In regards to claims 16-19, the conditioned light of the laser from the homogenizer and mask (Fig. 1) is capable of the focused patterns and is an intended use of the apparatus for forming the desired product.

It would have been obvious to one of ordinary skill in the art to modify Lambda with laser ablation, means for filling and removing as taught by Guida because it allows for the formation of an anti-scatter x-ray grid.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 10-12 and 15-17 have been considered but are not persuasive. Applicants primarily argue concerning Lambda and the wall ranges and thickness of the substrate. However, the claims argue of an angle

Art Unit: 1722

of less or equal to 0.25 degrees. This wall range includes 0 degrees or no slope to the wall and thus the wall ranges taught by Lambda would be unnecessary, since the laser placed in a perpendicular angle to the substrate would form the necessary opening with no slope. Additionally, Lambda teaches about the 'shallow angles' of the slope. The applicants argument about the angles and slope in relation to the plane of reference does not address the rejection since the claimed invention only claims the slopes being less than or equal to 0.25 degrees. There are no further referencing about this plane of reference. In regards to the thickness, the energy provided for the 50 micrometer thick substrate is set at a range of 30-50 m/cm<sup>2</sup>, and later in the same column on page 8, as pointed out by the applicant, Lambda discusses the use of 800 mJ/cm<sup>2</sup> for the laser. In correlation to the energy expenditure of the laser, this would enable for use in a substrate thickness of 800 micrometers, including the range of the expressed by the claims of 300 to 1500 micrometers. In regards to the arguments concerning Lambda in view of Guida, Lambda further claims of plasma-assisted etching techniques that is formed after laser ablation thereby forming the means for further removing additional portions of the substrate.

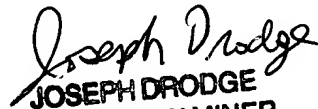
### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (703) 305-1558. The examiner can normally be reached on Monday through Friday 8 to 4.

Art Unit: 1722

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (703) 308-0457. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

E.L.  
October 8, 2003

  
JOSEPH DRODGE  
PRIMARY EXAMINER